Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Simultaneous Measurements of Force and Conductance through Single Molecular Junctions MICHAEL FREI, Department of Applied Physics and Applied Mathematics, Columbia University, New York, New York, MARIA KAMENETSKA, MARK S. HYBERTSEN, Center for Functional Nanomaterials, Brookhaven National Labs, Upton, New York, LATHA VENKATARAMAN — We measure the conductance of single molecules attached to gold electrodes by repeatedly forming and breaking junctions between a gold substrate and a gold-coated cantilever in a modified atomic force microscope (AFM). While transport through single molecular junctions has been investigated, we gain additional information through the simultaneous recording of the forces required to break these junctions. Specifically, the force traces show elastic and plastic deformation processes hidden in conductance measurements. Our single molecular conductance measurements reproduce the results obtained previously and we find that the forces required to break gold point-contacts is consistent with published results. Furthermore, we present a comparison of measured forces required to break the Au-N bond formed in our single molecule junctions and density functional theory (DFT) results.

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Date submitted: 04 Jan 2008 Electronic form version 1.4